NOTICE

All drawings located at the end of the document

DRAIT,

QUARTERLY REPORT

FOR OCTOBER THROUGH DECEMBER 1993

OPERABLE UNIT #1
IM/IRA TREATMENT FACILITY

PREPARED BY

ENVIRONMENTAL RESTORATION FACILITIES OPERATIONS MANAGEMENT

EG&G ROCKY FLATS GOLDEN COLORADO

> DOCUMENT CLASSIFICATION REVIEW WAIVER PER CLASSIFICATION OFFICE

ADMIN RECORD

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10 INTRODUCTION

The Operable Unit No 1 (OU 1) water treatment facility located in Building 891 is responsible for treating groundwater collected from the 881 Hillside area. The water is collected in a french drain located on the 881 hillside and pumped to the influent storage tanks located at Building 891 (see Figure 1). Next, the water is treated with an ultraviolet (UV) light/hydrogen peroxide system (for removal of volatile organic compounds) and a four step ion exchange (IX) system (for removal of uranium total dissolved solids anions and selected metals). After treatment, the water is stored in one of three effluent storage tanks until laboratory sample results verify that the water is acceptable for discharge into the South Interceptor Ditch (SID)

This report reflects the Building 891 Treatment Facility operations and data that are critical for determining optimal operating practices. Other aspects of the OU1 IM/IRA that are relevant to the day to day operation and maintenance of the collection system and treatment facility will be addressed within this report. Future reports will include both an operations report and a separate supplementary data report. The supplementary data report shall include surface water monitoring data groundwater monitoring well data and influent water characterization data. Only validated data results will be used to evaluate these parameters.

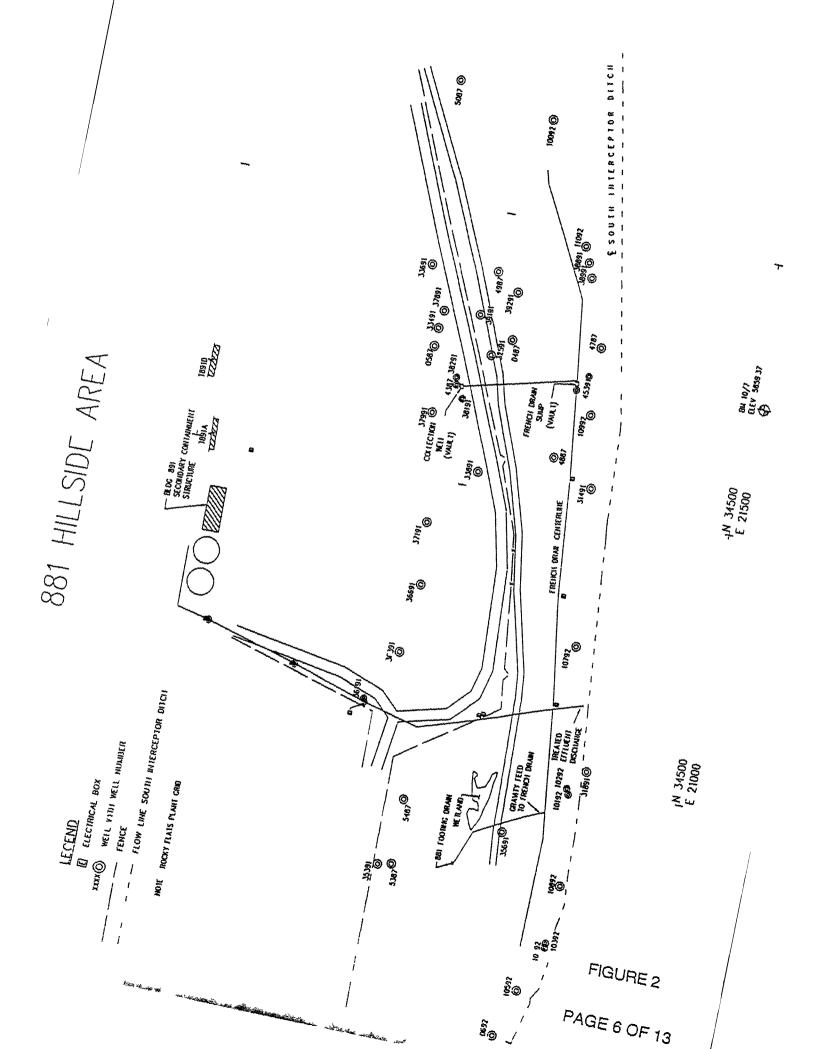
2 0 INFLUENT WATER CHARACTERISTICS

Influent water for the treatment facility comes from three different sources on the 881 Hillside. These sources include the 881 footing drain the recovery well CW001 (located upgradient of the french drain) and groundwater intercepted by the french drain. Water from the footing drain flows by gravity into the french drain mixes with groundwater and collectively flows by gravity towards the french drain sump (see Figure 2). Recovery well water is pumped directly into the french drain sump and mixed with the groundwater/footing drain water. The combined water is then pumped from the french drain sump into the treatment system influent tanks. Sampling is performed at each of the three sources as well as at the influent to the UV system for characterization of the influent waters.

2 1 INFLUENT FLOW RATES

The recovery well pump operated for 15 minutes during the past quarter. It was estimated (using the pump curve) from this pumping time that approximately 75 gallons of water were pumped from the recovery well during this period.

The damage caused by a high volume flowrate event in the late summer of 1993 was repaired. Flowmeter operations appeared normal at the beginning of this quarter. It was noted however that over a two month period the flowmeter constantly required calibration. The pipe extension which was utilized for the weir installation had undergone minor deflections resulting in variations of the probe readings. It was discovered that a 042 deflection caused the inaccurate readings. These minute



variations in the depth sensed by the probe cause significant error in the flow measurements taken by the equipment rendering data from October November and December inaccurate. These deflections were likely caused by periodic high flowrate events during periods of heavy precipitation. It is estimated that approximately 300 000 gallons of water entered the system from the 881 footing drain during the past quarter. However these flowrates cannot be verified since the flowmeter will not currently hold calibration. A work package was issued to install a more rigid pipe extension to eliminate these deflections and maintain a constant depth reading Installation is expected to take place in February.

installation of magnetic flowmeters on the Building 891 influent and effluent lines is nearly complete. The data from these flowmeters will be compared to that of the 881 footing drain flowmeter for future mass balance calculations.

2 2 INFLUENT CONTAMINANTS

Review of the most recent data from the french drain sump and UV/Peroxide Unit indicates no significant change in the levels of contamination. Therefore, the current configuration of the treatment system remains sufficient to handle groundwater from the hillside.

3 0 TREATMENT FACILITY PERFORMANCE

The treatment system performance is measured by various criteria. Quantity of water treated contamination destruction or removal efficiency waste generation operating costs chemical usage and system reliability. Data on these criteria is utilized to modify or adjust the system as necessary for optimal performance. An operations database system is presently under development for computerized data entry of all operational information.

3.1 QUANTITY OF WATER TREATED

Approximately 210 000 gallons of groundwater were treated at the treatment facility during the past quarter. Approximately 220 000 gallons of treated effluent were released to the South Interceptor Ditch. Approximately 1 800 000 gallons of groundwater have been processed through the system to date

3 2 WATER FROM OTHER SOURCES

An estimated 9 000 gallons of decontamination pad water was accepted at the treatment facility during the quarter. The decontamination pad water requires treatment at Building 891 due to low level volatile organics that cannot be processed through the 374 evaporator. This water currently remains stored in influent tank TK 201 until it can be processed through the treatment system.

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3 3 CONTAMINATION DESTRUCTION/UV SYSTEM AND ION EXCHANGE SYSTEM EFFICIENCY SAMPLING

The primary purpose of sampling inside Building 891 is to determine the proficiency of the system for removing target contaminants (uranium metals anions VOCs) The information presented in this section provides some insight on the removal efficiency of the ion exchange columns and the parameters determining the limiting factor in the system. Due to laboratory turn around times not all data presented will be from the current quarter. This information will be utilized to determine which column is the limiting factor in the ion exchange system. The manufacturer recommends regeneration of the resins at least every 56 500 gallons. In the data below (34 000 gallons treated since last regeneration of IX#2 IX#3 and IX#4) it is evident that extensive ion exchange is still taking place in both IX#3 and IX#4. However, it is clear that at this point in 56 500 gallon cycle the OH ion concentration facilitated by the IX#4 anion exchange is no longer sufficient to counterbalance the H+ concentration in the effluent from IX#3 cation exchange The result is an excess of H+ ions in the overall effluent from the system driving the pH near or below 6 Therefore a regeneration of at least IX#4 must be performed at this time since a pH of 6 9 must be maintained in the effluent tanks for discharge. This type of information will continue to be used to determine factors that can be adjusted to increase the performance of the system

3 3 1 ION EXCHANGE COLUMN #1

IX#1 contains a strong base anion exchange resin which serves to remove uranium from the groundwater. Influent water contains uranium in the form of a carbonate complex (negatively charged). This ion loads on the weak base resin located in the first ion exchange column, thus removing uranium from the water. Unlike the other resins in the system, this resin is not regenerated. A recent sample for total uranium 233–234, 235–238 showed removal efficiency of essentially 100%. The results of this sample are listed below.

	INFLUENT	EFFLUENT
SAMPLE #	FT10059RG	FT10060RG
DATE RESULT	July 7 1993 7 71 ± 1 54 pci/l	July 7 1993 024 ± 2 pci/l

3 3 2 ION EXCHANGE COLUMN #2

The IX#2 resin is a weak acid cation exchanger utilized in conjunction with a strong acid cation exchanger for the removal of alkalinity and hardness (calcium magnesium carbonate and bicarbonate). The removal efficiency for these parameters is not of special interest (no ARARs for these parameters) and therefore is not sampled in this capacity.

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333 ION EXCHANGE COLUMN #3

The IX#3 resin is termed as a strong acid cation exchanger. The primary function of this column is to remove hardness (Ca2+ and Mg2+) and metals from the water. Sample results obtained from the effluent of IX#2 and IX#3 provide valuable information about the performance of this resin. The following presents data acquired from recent samples taken at these locations.

PARAMETER	SAMPLE	SAMPLE	% REMOVAL
	FT10123RG 11/16/93 IX2 EFFLUENT pH=3 50	FT10124RG 11/16/93 IX3 EFFLUENT pH=2 9	
Total Dissolved Solids	296 mg/l	64 mg/l	78%
Dissolved Calcium	17300 μg/l	149 μg/l (B)	99/
Dissolved Magnesium	15000 μg/l	28 6 μg/l (U)	99/
Dissolved Potassium	3160 μg/l	694 μg/l (B)	78%
Dissolved Sodium	51500 μg/l	5840 μg/l	89%
Dissolved Zinc	8 4 μg/l (B)	175 μg/l	
Dissolved Strontium	131 μg/l	1 1 μg/l (B)	99 %
Dissolved Lithium	13 4 μg/l	2 6 μg/l (U)	80%

Samples taken after 34 000 gallons of water were treated through the column since the last regeneration of the resins. Presented results are preliminary not validated. All CLP metals were analyzed however most results were very close to detection limits and therefore were not useful in this analysis.

- (B) Less than method detection limit but greater than or equal to instrument detection limit
- (U) Parameter not detected at specified value

The reduction of pH through IX#3 from 3 5 to 2 9 indicates that the H+ exchange is indeed taking place. This is supported by the removal efficiency (about 90 %) demonstrated in the above data. It is currently assumed that the IX#3 effluent zinc result is erroneous (since this is a divalent cation would be expected to be exchanged in a similar fashion as other divalents) and should not be used in evaluating the zinc removal efficiency. Although this value is still within ARAR, the source of the inconsistency must be identified to eliminate future problems. When further data at these locations have been acquired a more extensive evaluation can be made.

3 3 4 ION EXCHANGE COLUMN #4

The IX#4 resin is a weak base anion exchange resin. The primary function of this resin is to remove anions (such as chloride sulfate nitrate/nitrite etc.) from the water. Data on the removal efficiency of IX#4 is obtained in a similar manner as described for the other IX locations. Samples are taken from the effluent of IX#3 and IX#4 to observe the loading of anions on the resin bed. Note that the IX#4 effluent is the overall effluent from the treatment system. The following summarizes a recent sample result.

PARAMETER	FT10124RG 11/16/93 IX3 EFFLUENT pH=2 9	FT10125RG 11/16/93 IX4 EFFLUENT pH=6 1	ARAR
Chloride Sulfate	102 mg/l 45 7 mg/l	4 2 mg/l 5 0 mg/l (U)	250 mg/l 250 mg/l
Total Dissolved Solids	64 mg/l	35 mg/l	400 mg/l

Samples taken after 34 000 gallons of water were treated through the column since the last regeneration of the resins. Results are preliminary not validated

(U) Parameter not detected at specified value

34 CHEMICAL USAGE

Hydrochloric acid is utilized in the ion exchange system for regeneration of resins in IX#2 (weak acid cation exchanger) and IX#3 (strong acid cation exchanger). The resin in IX#4 (weak base anion exchanger) is regenerated with sodium hydroxide.

A total of 644 gallons of hydrochloric acid and 387 gallons of sodium hydroxide were used for regeneration and neutralization activities. Approximately 7 gallons of hydrogen peroxide were used for the UV/Peroxide destruction unit. Shipments of acid and caustic were received in December. The cost for the two shipments total approximately \$2 200. Some problems were experienced with a shortage of hydrochloric acid through commercial vendors. Most vendors could not supply the amount of acid needed. It is unknown at this time whether this problem may be experienced in the future.

35 WASTE GENERATION

Waste generated at the treatment facility includes sock filters and neutralized regenerant water. Less than one 55 gallon drum of sock filters has been generated in 21 months of operation. Eight tanker truck loads of neutralized regenerant water from Tank T 210 (31 000 gallons) were sent to the 374 evaporator for processing

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The eight listed D codes for the neutralized regenerant water were removed by EG&G Waste Technical Support based on sample analysis that were taken from the neutralization tank

3 6 OPERATING COSTS

Subcontracted operating costs for this quarter totaled approximately \$48 000 These costs include chemical purchases spare parts labor and document preparation

37 MAINTENANCE

The following maintenance was performed during the October through December operating period

Relocation of valves on the ion exchange system was completed. This relocation was necessary in order to calibrate conductivity and pH probes in a timely fashion. Previously it was necessary to drain ion exchange vessels to perform some calibrations.

A backpressure valve was replaced on the acid regeneration skid

Brass tags were prepared for labeling of valves Approximately 80% of the valves in the system are now properly labeled per plant standards

The leak detection system was restored to full operational status (the system had been partially damaged by a lightning strike)

The gamma detection system computer was moved into the office area in preparation for future plans to monitor the gamma detection and gas chromatograph operations from the office

The phone jack for modem connection to the gas chromatograph computer was installed

The conductivity controller for ion exchange IX#2 was replaced

The 881 footing drain solar panel was installed and achieved operability status

Additional support crossbracing was installed on the ion exchange system regeneration piping

An engineering work request was generated to develop a more stable installation mechanism for the 881 footing drain flowmeter. The design was completed and parts are due to be delivered in February for installation.

38 SYSTEM OPTIMIZATION

A test plan was developed to provide additional system testing and optimization on the treatment system. The goal of this testing is to more accurately determine current system performance and predict system performance at higher contaminant levels. Results may also provide information on streamlined operations. Data collection will be begin in February 1994.

4.0 ENVIRONMENTAL COMPLIANCE/EFFLUENT TANK SAMPLING

Each effluent tank is sampled and analyzed prior to discharge. During the past quarter two effluent tanks (TK 206 and TK 207) were discharged (approximately 220 000 gallons) into the south interceptor ditch. All parameters were below ARAR for these tanks.

5 0 REPORTS AND CORRESPONDENCE

The Scientific Notebook Plan was completed for system optimization activities at Operable Unit #1 This plan outlines the format to be utilized for documenting optimization work at the OU1 treatment facility

Standard Operating Procedures have been prepared and are currently under review

An 881 Footing Drain Report comparing ARARs to the analytical results is currently being developed

A letter was received from Waste Guidance removing listed D codes

6.0 ANTICIPATED OPERATIONS FOR NEXT QUARTER

Normal operations will continue through March It is expected that increased influent flowrates may be experienced at the end of March Increased hours of operation may be necessary to keep pace with the spring flowrates

The delivery of the gas chromatograph has been delayed due to optimization testing of the unit by the vendor. Some problems obtaining reproduceability have now been resolved in addition. Environmental Operations Management is working with support organizations to resolve health and safety issues. It is expected that the unit will be installed by the end of February.

7.0 SUMMARY/CONCLUSIONS

The volume of water treated at the plant during the past quarter remained somewhat low it is expected that increased flows will be experienced in late March. Approximately 1 800 000 gallons of water have been treated to date at the treatment facility

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An 881 Footing Drain Report comparing ARARs to the analytical results is currently being developed by the Environmental Science and Engineering Division

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	4/29/93	6/16/93	7/7/93	8/4/93	ARAR	# OF	# ABOVE	MIN	MAX
	FT10005RG	FT10044RG	FT10055RG	FT10076RG		SAMPLES	ARAR	VALUE	VALUE
Methylene Chloride	-	Þ	5	ב	လ	4	0	Ð	כ
Acetone	D	ב	ם	Þ	50	4	0	ם	Ð
1 1 Dichto oett ene	n	n	ח	n	s,	4	0	ם	Þ
1 1 Dichlo oethane	ח	D	ם	Þ	7	4	0	<u>ם</u>	n
1 2 D chlo oetha e	ם	כ	ם	5	2	4	0	ם	¬
1 1 1 T I hlo oetle	D	ם	D	ם	ĸ	4	0	ח	כ
Carbon Tet act loride	D	ם	ם	5	200	4	0	ח	ם
1 1 2 T ichlo oethane	n	5	ר	Ð	ß	4	0	ח	n
T chi oethe e	9	7	4.	13	s	4	က	4.	13
T tachi oeth ne	ח	27	5	2 J	ĸ	4	0	ח	2 J
Tolu	>	ם	כ	5	2000	4	0	Ð)
Alm E	Þ	ם	29 3 B	49 2 B	2000	4	0	n	49.2 B
Antimo y	ם	כ	כ	5	60	4	0	ס	n
A senic	14B	23B	16B	J	20	4	0	ם	23B
Barium	48 B B	52 8 B	50 5 B	53 5 B	1000	4	0	48 8 B	53 5 B
Beryll m	D	ס	ב	כ	100	4	0	ח	ח
Cad n m	Þ	Þ	ם	5	10	4	0	ח	ם
Ch ai a	ם	42B	ם	ם	50	4	0	<u>ר</u>	4 2 B
Coppe	¬	Þ	25B	34B	200	4	0	Þ	34B
0,1	ם	515B	170	23 5 B	300	4	0	ם	170
Lead	178	23B	ב	ם	50	4	0	n	23B
Lithium	25 0 B	28 4 B	23 7 B	26 7 B	2500	4	0	23 7 B	28 4 B
Manganeso	n	כ	ם	13B	50	4	0	ח	138
Me cury	n	⊃	ב	ב	8	4	0	ກ	D
Molybde m	ר	D	ח	כ	100	4	0	n	n
N ckei)	ב	Þ	כ	200	4	0	n	n
Seleni m	572	470	542	635	10	4	4	470	635
SI er	5	כ	ח	388	50	4	0	D	38B
Thallium	ב	Þ	⊃	Þ	10	4	0	D	n
Vandrum	17 0 B	21 6 B	⊃	כ	100	4	0	n	216B
Zinc	37 5	55 9	715	73 3	2000	4	0	37 5	73 3
Total Dissolved Solids	815 mg/l	771 mg/l	730 mg/l	830 mg/l	400 mg/l	4	4	730 mg/l	830 mg/l
Chlor de	177 mg/l	175 mg/l	180 mg/l	210 mg/l	250 mg/l	4	0	175 mg/l	210 mg/l
Nit ate/Nit ite	5 76 mg/l	6 0 mg/i	4.7 mg/l	6 1 mg/l	10 mg/l	4	0	4 7 mg/i	6 1 mg/l
S II te	213 mg/l	215 mg/l	230 mg/l	240 mg/l	250 mg/l	4	0	213 mg/l	240 mg/l

	4/29/93 FT10005RG	6/11/93 FT10034RG	7/7/93 FT10055RG	8/4/93 FT10076RG	ARAR	# OF SAMPLES	# ABOVE ARAR	MIN	MAX VALUE
G oss Alpha Er or	20 1 pc // 6 1	9 311 pci/l 3 43	5 393 pci/l 2 377	9 628 pci/l 2 652	15 pc//	4		5 393 pci/l 2 377	20 1 pci/l 6 1
G oss Alph (Duplicate) E or		7 372 pci/l 2 56							
G oss Bei Error	6 88 pci/l 2 24	8 107 p ul 2 68	4 868 pcl/l 1 308	0 867 pci/l 1 124	50 pci//	4	0	0 867 pc/l 1 124	8 107 pci// 2 68
G oss Beta (D phcate) E or		6 225 p // 2 51							
U ani m (233 234 235 Error	2	æ	7 007 pcM 0 753	17 978 p 1/l 2 557	40 pci/l	84	0	7 007 pci// 0 753	17 978 pcI/I 2 557
Stotim Eror	0 0657 pci/l 0 326	2981 pc/l 0 324	0 109 p i/l 0 143	0 046 pci/l 0 121	8 p i/i	4	0	0 046 p // 0 121	2981 pci/l 0 324
Pluto m E or	0 00178 p i/i 0 00347	(000499)pci/l 0 001	0 003 p VI	(001) p i/i 0 003	15 p M	4	•	(000499 p /l) 0 001	0 003 p 1/1 0 003
Pluto i m (D plicate) E ror		001561 p i/l 0 00429							
Americium E or	0 00406 pci// 0 00403	001588 pci// 0 00292	0 022 p i/l 0 007	0 pci/I	4 pc//	4	0	0 001	0 022 0 007
Ame cum (Duplicate) E or		0 pci/l							
Titim Error	(122) pcu/l 234	0 pc// 234 88	79 65 pc// 132 378	49 42 pci/l 139 062	20000 pci/l	4	0	(122) 234	79 65 132 378
ANC ANALYSIS NOT COMPLETE B (VOLATILES) PARAMETER ALSO FOUND IN LABORATORY BLANK B (METALS) LESS THAN METHOD DETECTION LIMIT BUT GREATER THAN OR U PARAMETER NOT DETECTED	ETE 1 ALSO FOUND IN L/ THOD DETECTION LI ED	ABOFIATORY BLANK JMIT BUT GREATER '	THAN OR		J VALUE ESTIMATED BELOW DETECTION LIMIT NS-NOT SAMPLED Note Results are in UG/L unless specified	TED BELOW ED re in UG/L un	DETECTION less specife	LIMIT	

	4/29/93	6/11/93	7/7/93	8/4/93	9/29/93	APAR	# 9	# ABOVE	N	MAX
	FT10004RG	FT10031RG	FT10053RG	FT10074RG	FT10094RG		SAMPLES	ARAR	VALUE	VALUE
Methyl Chi nde	2 BJ	28 B	Þ	>	Þ	ıo	ĸ	-	ם	28 B
Ac t	ם	13 B	ח	כ	ם	20	ĸ	0	13 B	13 B
11 D 11 lhe	ם	כ	ב	כ	Þ	5	S	0)	n
1 1 Dict I thane	n	٦	ם	כ	Þ	7	ĸ	0	Ð	Ð
12 Doll oeth ne	ם	ם	n	כ	כ	ĸ	ĸo	0	ם	ם
111T ho th	כ	כ	כ	ם	ם	22	ĸ	0	n	ס
C bon T I chlo id	ב	כ	۵	ם	٦	200	ĸ	0	n	5
112 Tchloth	n	ב	ם	ב	ם	ĸ	ĸ	0	Ð	כ
Tichlo 11 ne	ס	ם	ם	ם	ם	ĸ	ĸ	0	D	כ
T i hi sh	4 J	ס	ם	ם	ם	ĸ	ĸ	0	ם	3
	Þ	כ	Þ	ם	Þ	2000	หา	0	Þ	ם
Ak min m	Э	96 6 B	3178	22 7 B	56 1 B	2000	ĸ	0	ב	8 9 96 8
A tm y	כ	כ	ם	19 3 B	ם	09	ĸ	0	כ	19 3 B
- ×	Þ	n	5	ם	כ	20	sc.	0	D	ם
Barium	139 B	154 B	158 B	156 B	164 B	1000	ĸ	0	139 B	164 B
Bryllim	כ	47 8	ם	כ	128	100	ß	0	ח	12 B
Cadmium	Þ	ס	ɔ	כ	ם	10	ĸ	0	ם	Þ
Ch omíum	כ	כ	כ	۵	ב	20	ĸ	0	ם	>
Coppe	ɔ	¬	כ	26B	כ	200	ß	0	ם	26B
8 -	192B	28 B	31 5 B	5	9 6 B	300	ĸ	0	D	31 5 B
רק	כ	258	ב	۵	>	20	ĸ	0	n	25B
Lithi m	26 0 B	16 0 B	14 B B	17.5 B	13 B B	2500	so.	0	13 8 B	26 0 B
Manganes	ח	278	כ	1 38	ם	20	S	0	D	278
Μαŋ	>	כ	ב	5	5	87	un	0	Þ	ב
M lybde m	ח	כ	-	>	Þ	100	ß	0	>	>
Nick 1	ם	>	Þ	5	ב	200	S	•	D	>
Selenium	168	5	388	36B	24B	10	ĸ	0	D.	38B
Silve	כ	ח	ח	כ	כ	20	ĸ	0	Þ	ɔ
Th flum	Þ	Þ	כ	ם	כ	10	S	0	ם	כ
n pu A	288	728	ם	כ	כ	100	S	0	כ	728
Zinc	34 3	52	48 9	29 2	37 3	2000	ĸ	0	29 2	52
T t 1 Dissol ed Solids	526 mg/l	589 mg/l	510 mg/l	470 mg/l	500 mg/l	400 mg/l	ĸ	ហ	470 mg/l	589 mg/l
Chlo ide	102 mg/l	102 mg/l	120 mg/l	110 mg/l	110 mg/l	250 mg/l	S	0	102 mg/l	120 mg/l
Ni t /N tit	6 84 mg/l	7 6 mg/l	66 mg/l	6.7 mg/l	6.3 mg/l	10 mg/l	ιΩ	0	63 mg/l	7 6 mg/l
S Hat	37 0 mg/l	38.3 mg/l	44 mg/l	47 mg/l	45 mg/l	250 mg/l	LO.	0	37 0 mg/l	47.0 mg/l

MAX	7 44 pcVI 2 7	588 p v/l 246	7 541 p <i>I</i> /l 1 463	0 8739 p v/l 0 405	025 p vl 0 014	022 pci/l 0 007	79 650 p VI 132 378	
MEN	3 734 p <i>V</i> l 1 964	3744 p // 1318	6 388 p i/l 0 968	059 p vl 0 257	(00152) p i/l 0 00137	001 p v/l 0 003	0 p vi 236 41	
# ABOVE ARAR	0	0	0	0	0	•	0	
# OF SAMPLES	ဟ	ហ	ო	ဟ	ស	ĸ	ဟ	
APAR	15 p VI	50 p 1/l	40 p v/l	8 p i/i	15 p W	4 p i/i	20000 p M	
9/29/93 FT10094RG	3 734 pci/l 1 964	3744 p // 1318	6 388 p v/l 0 968	059 p v/l 0 257	025 p vl 0 014	0 001 p 1/l 0 003	21 810 pci/l 145 981	
8/4/93 FT10074RG	5 131 p v/l 2 311	4 213 p VI 1 343	7 541 p v/l 1 463	177 p I/I 0 158	002 p v/l 0 009	001 pci/l 0 002	52 96 pci/l 139 278	
7/7/93 FT10053RG	5 393 p v/l 2 377	4 868 p v/l 1 308	7 007 p VI 0 753	0 109 p v/l 0 143	0 003 p i/i	0 022 p v/l 0 007	79 650 pcM 132 378	
6/11/93 FT10032RG	4 564 pa/l 1 95	4 437 pcull 1 84	2	0 8739 p VI 0 405	0 01522 p M 0 0116	0 002812 pc// 0 00399	0 p vl 236 41	70 67 pcu/l
4/29/93 FT10004RG	7 44 pci// 2 7	588 p VI 246	92	0 344 p i/l 0 417	(000152) p W 001522 p 000137 00116	0 00333 pcl/l 0 00457	559 p W 243	
			22					e)
	G s Alph E	G B 1 E or	я Б Э	= ∈ E	Plut i Erro	Ame ic m E	T tium E	Tim (Dpl te)

B (VOLATILES) PARAMETER ALSO FOUND IN LABORATORY BLANK ANC ANALYSIS NOT COMPLETE

B (METALS) LESS THAN METHOD DETECTION LIMIT BUT GREATER THAN OR EQUAL TO INSTRUMENT DETECTION LIMIT J VALUE ESTIMATED BELOW DETECTION LIMIT U-PARAMETER NOT DETECTED

-z

NS NOT SAMPLED

ω		6/11/93	7/7/93	8/4/93	9/29/93	ARAR	# 0F	# ABOVE	N.	MAX
no Chloride 29 B U U U 10 centhane U U U U 10 centhane U U U U 10 centhane U U U U 1 chlor cethane U U U U 1 chlor cethane U U U U 1 chlor othane U U U U <t< th=""><th></th><th>FT10035RG</th><th>FT10056RG</th><th>FT10075RG</th><th>FT10096RG</th><th></th><th>SAMPLES</th><th>ARAR</th><th>VALUE</th><th>VALUE</th></t<>		FT10035RG	FT10056RG	FT10075RG	FT10096RG		SAMPLES	ARAR	VALUE	VALUE
18.0 U	Methylene Chloride	29 B	Þ	D	Þ	ĸ	4	-	Þ	29 B
to cethene U	Aceton	7 83	ם	D	ם	20	4	0	ח	7 BJ
lo cethane U U U U U U U U Contrane U U U U U U U U U U U U U U U U U U U	1 1 Dichto oethene	ם	n	ס	n	ς,	4	0	ם	ח
loroethane U U U U U U U U Tet chloride U U U U U U U U Tet chloride U U U U U U U U Solth e U U U U U U U O cethe e 2 J I J J U U U O cethe e 2 J I J U U U O U U U U U O U U U U U O U U U U	1 1 Dict lo oethane	n	ם	ם	ח	7	4	0	ם	ם
table oethane U U U U U U U U U U U U U U U U U U U	1.2 Dict loroethane	ב	ם	ם	ם	ហ	4	0	5	כ
Tel chloride U U U U U U U U U U U U U U U U U U U	1 1 1 Tichlo oethane	ລ	ລ	٦	٦	S	4	0	ב	ב
chloro than b U U U U U U U U U U U U U U U U U U	C rbo Tet chloride	ם	ח	ח	n	200	4	0	ם	5
bein e U U U U U U U lo oethe e 2 J 1 J U U U lo oethe e 2 J 1 J U U U lo oethe e 2 J 1 J U U U lo U U U U U lo U U U U U lo U U U U U U lo U U U U lo U U U U U U lo U U U U U lo U U U U U U U lo U U U U U U lo U U U U U U lo U U U U U U U U lo U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U lo U U U U U U U lo U U U U U U U U lo U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U lo U U U U U U U U U U lo U U U U U U U U U U lo U U U U U U U U U U lo U U U U U U U U U U U lo U U U U U U U U U U U U lo U U U U U U U U U U U U lo U U U U U U U U U U U U U lo U U U U U U U U U U U U U lo U U U U U U U U U U U U	112 Tr chloro thane	ם	n	כ	ם	ĸ	4	0	ם	ח
boothe e 2 J 1 J 0 U U U m 474 B 394 B 322 B U yy U U U U U n 199 B 165 B 168 B 165 B n U U U U U n U U U U n U U U U n U U U U		כ	ם	ם	ם	S.	4	0	ם	כ
m 474 B 394 B 322 B U yy U U U U yy U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U	Tet achlo oethe e	2 J	<u>.</u>	ם)	22	4	0	ס	2 J
mm 474 B 394 B 322 B U	Tol e e	ם	Þ	>	ם	2000	4	0	ם	ח
yy U U U 189 B 165 B 168 B 185 B nn U U U nn U U U nn U U U nn U U U nn U U 33 B nn U 37 B 36 B nn U 139 B 310 B 214 B nn U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U </th <th>Al min m</th> <th>47 4 B</th> <th>39 4 B</th> <th>32 2 B</th> <th>Þ</th> <th>2000</th> <th>4</th> <th>0</th> <th>ם</th> <th>47 4 B</th>	Al min m	47 4 B	39 4 B	32 2 B	Þ	2000	4	0	ם	47 4 B
33B 24B 67B 3B nn U U U U nn U U U U nn U U U U nn U U U U U nn U U U 33 B 316 B 314 B see 22 B U 11 B 11 B <t< th=""><th>Antimony</th><th>ם</th><th>ח</th><th>כ</th><th>ב</th><th>09</th><th>4</th><th>0</th><th>כ</th><th>ח</th></t<>	Antimony	ם	ח	כ	ב	09	4	0	כ	ח
nn 189 B 165 B 168 B 185 B nn U U U U nn U U U U nn U U U 33 B n U U 37 B 36 B n U U 14 B n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U U n U U U	Asnc	33B	24B	67B	38	50	4	0	24B	678
n U U U U n U U U U U n U U 0 U 33 B 30 B U U U U U U 14 B S14 B U	Ba m	189 B	165 B	168 B	185 B	1000	4	0	165 B	189 B
n U U U 33 B n U 10 0 33 B U 139 B 310 B 214 B 84 10 B 15 B 11 B 15 156 B 15 B 144 B 15 156 B 15 B 14 B 10 U U U 10 <td< th=""><th>Bryll m</th><td>ם</td><td>ם</td><td>ס</td><td>Þ</td><td>100</td><td>4</td><td>0</td><td>כ</td><td>כ</td></td<>	Bryll m	ם	ם	ס	Þ	100	4	0	כ	כ
m U U 0 37 B 36 B 10 B 15 B 11 B 15 B 11 B 15 B 11 B 11	Cadmi m	Þ	ב	כ	ם	10	4	0	ב	כ
U U 37 B 36 B U 139 B 310 B 214 B 84 10 B 15 B 11 B 15 156 B 195 B 144 B 10 U U U	Ct owl m	Þ	ס	כ	33B	20	4	0	D	338
B4 10B 15B 11B 11B 11B 15B 11B 15B 11B 15C B 195B 114B 114B 195B 114B 114B 10C C C C C C C C C C C C C C C C C C C	Copper	Þ	ם	37B	368	200	4	0	ם	378
se 10 B 15 B 11 B se 15 B 19 5 B 14 4 B u u u u u u u u u u u u u u u u u u u u u u u u v u u u solved Solids 575 mg1 530 mg/l 110 mg/l 1trite 71 mg/l 62 mg/l 58 mg/l 1trite 71 mg/l 52 mg/l 56 mg/l	01	-	13 9 B	31 0 B	21 4 B	300	4	0	ם	310B
se 22 B 195 B 144 B 144 B 16 B 195 B 144 B	Lead	8 4	10B	158	118	50	4	0	10B	8 4
se 22B U 11B U C U U U U U U U U U U U U U U U U U	Lithium	15	15 6 B	19 5 B	14 4 B	2500	4	0	15	19 5 B
Hamiltonian Hamilt	Manganese	2 2 B	ם	118	5	20	4	0	ם	22B
by the control of the	Mercury	כ	כ	כ	כ	8	4	0	5	ב
85 B 79 B 77 65 S U U U U U U U U U U U U U U O U U U O U U U O U U O O O I O O I O O I O O O I		Þ	כ	כ	כ	100	4	0	ב	כ
85B 79B 777 65 U U U U U U U U U U D U U U U O U U U U O O O 703 681 137 199 solved Solids 575 mg1 530 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 1110 mg/l 1110 mg/l 110	Nickel	Þ	ລ	ב	ח	200	4	0	ם	כ
U U U U U U U U U U U U U U U U O U U O U U O U U O O I O O	Selenum	8 5 B	7 9 B	7.7	6 5	10	4	0	6 5	8 5 B
U U U A 7 B U U U 70 3 68 1 137 199 solved Solids 575 mg1 530 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 11rite 7 1 mg/l 62 mg/l 55 mg/l 47 8 mg/l 52 mg/l 55 mg/l 56 mg/l	Sil er	n	ם	ם	ם	50	4	0	ລ	n
70 3 68 1 137 199 50lved Solids 575 mg 1 530 mg/l 520 mg/l 110 mg/l 110 mg/l 110 mg/l 1110 mg/l 1110 mg/l 1110 mg/l 58 mg/l 52 mg/l 52 mg/l 55 mg/l	Thallium	כ	ວ	ב	כ	10	4	0	ם	n
70 3 68 1 137 199 solved Solids 575 mg 1 530 mg/l 520 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 111 mg/l 62 mg/l 62 mg/l 56 mg/l 56 mg/l	Vanad m	478	-	o	Þ	100	4	0	ם	47B
solved Solids 575 mg l 530 mg/l 520 mg/l 510 mg/l 102 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 11rile 7 1 mg/l 6 2 mg/l 58 mg/l 47 8 mg/l 52 mg/l 56 mg/l	Zinc	703	68 1	137	199	2000	4	0	68 1	199
102 mg/l 110 mg/l 110 mg/l 110 mg/l 110 mg/l 11tile 7 1 mg/l 62 mg/l 58 mg/l 56 mg/l 56 mg/l	Total Dissolved Solids	575 mg l	530 mg/l	520 mg/l	510 mg/l	400 mg/l	4	4	510 mg/l	575 mg/l
N trite 7 1 mg/1 6 2 mg/1 5 8 mg/1 47 8 mg/1 52 mg/1 62 mg/1 56 mg/1	Chi ide	102 mg/l	110 mg/l	110 mg/l	110 mg/l	250 mg/l	4	0	102 mg/l	110 mg/l
47 8 mg/l 52 mg/l 62 mg/l 56 mg/l	Nitrat /N trite	7 1 mg/l	6.2 mg/l	6.2 mg/l	58 mg/l	10 mg/l	4	0	58 mg/l	7 1 mg/l
	S lfate	47 8 mg/l		62 mg/l	56 mg/l	250 mg/l	4	0	47 B mg/l	62 mg/l

	6/11/93	7/7/93	8/4/93	9/29/93	APAR	# OF	# ABOVE	MIK	MAX
	FT10036RG	FT10056RG	FT10075RG	FT10096RG		SAMPLES	ARAR	VALUE	VALUE
Gross Alpha E or	4 781 pci/l 2 24	4 106 pci/l 2 195	1 697 pci/l 1 377	4 849 pci/l 2 315	15 pci/i	4	0	1 697 pci/l 1 377	4 849 pci/i 2 315
G oss Beta Error	5 019 pci/l 2 23	3 849 pci/l 1 355	3 517 pci/l 1 302	2277 pcl/l 1212	50 pci/l	4	0	2 277 pci/l 1 2 1 2	5 019 pci/l 2 23
U nlum (2332 ,235 2) E Or	2	7 734 pci/l 0 847	8 198 pci/l 1 464	6 388 pci/l 0 968	40 pci/l	က	0	6 388 pci/l 0 968	8 198 pci/i 1 464
Siot m E or	3207 pci/l 0 311	(011) pci// 0 109	0 027 pci/l 0 104	059 pc/l 0 257	8 pci/l	4	0	(011) p i/l 0 109	3207 pci/l 0 311
Plutoni m E o	2454 pci/l 0 0287	453 pci/l 0 071	(003) pci/l 0 004	025 pc/l 0 014	15 pc//	4	0	(003) pcl/l 0 004	453 pci/l 0 071
Ame ici n Ero	00382 pci/l 0 00766	(001) pci// 0 002	001 p i/i 0 007	001 pci/l 0 003	4 p i/i	4	0	(001) pci// 0 002	00382 p i/l 0 00766
T iii m E o	0 pci/l 236 45	137 7 pci/l 135 495	35 660 pcl/l 139 807	21 810 pci// 145 981	20000 pci/l	4	0	0 pci// 236 45	137 7 pci/l 135 495

B (METALS) LESS THAN METHOD DETECTION LIMIT BUT GREATER THAN OR EQUAL TO INSTRUMENT DETECTION LIMIT B (VOLATILES) PARAMETER ALSO FOUND IN LABORATORY BLANK

J VALUE ESTIMATED BELOW DETECTION LIMIT ANC ANALYSIS NOT COMPLETE

U PARAMETER NOT DETECTED

NS-NOT SAMPLED

Note Res Its are i UG/L nless specified

ION EXCHANGE COLUMN NUMBER 1 EFFICIENCY

Date	Parameter	Inf Result	Inf error	Eff Result	Eff error
4/29/93	Gross alpha	6 199	2 082	0 212	1 178
	Gross Beta	4 351	1 022	3 736	0 906
	Ur 233 234	NS		NS	
	Ur 235	NS		NS	
	Ur 238	NS		NS	
	Sr 89 90	0 071	0 157	0 02	0 19
	Pu 239 240	(002)	0 002	0 003	0 005
	Am 241	0 002	0 005	(001)	0 004
	Cs 137	(134)	0 108	(085)	0 097
	Tritium	127	152 723	54 08	148 392
6/11/93	3 Gross alpha	3 607	1 754	(1 155)	1 57
	Gross Beta	4 096	0 814	3 455	0 757
	Ur 233 234	NS		NS	
	Ur 235	NS		NS	
	Ur 238	NS		NS	
	Sr 89 90	0 103	0 199	0 147	0 202
	Pu 239 240	(017)	0 033	0 023	0 046
	Am 241	0 001	0 004	0 001	0 003
	Cs 137	(036)	0 153	0 043	0 117
	Tritium	31 97	146 216	177	155.31
7/7/93	3 Gross alpha	4 4	2 1	0 16	1 4
	Gross Beta	2 3	1 5	1 5	1 2
	Ur 233 234	4 3	0 78	(047)	0 0936
	Ur 235	0 11	0 11	0	0 056
	Ur 238	3 3	0 65	0 023	0 047
	Sr 89 90	(013)	0 15	0 076	0 11
	Pu 239 240	0 002	0 003	(001)	0 004
	Am 241	0 002	0 004	0	0 003
	Cs 137	(11)	0 1	0 007	0 099
	Tritium	140	150	250	160

ALL VALUES IN PCI/L NS NOT SAMPLED

GROUND WATER MONITORING WELL PARAMETERS JUNE THROUGH SEPTEMBER

The three wells located at or near the western termination of the french drain continue to demonstrate some parameters above ARAR. Volatile organic compounds (VOCs) that have ARARs were detected (Toluene \approx 35 μ g/l. Tetrachloroethene \approx 1 μ g/l. Trichloroethene \approx 1 μ g/l) at limits well below treatment requirements in several locations. The contamination found in these wells is being evaluated and will be presented in the OU1 Phase III Remedial Investigation Report

The following data represent contaminants exceeding ARARs at the french drain monitoring well locations

<u>WELL #</u> 10492+	DATE 6/11/93 6/11/93 6/11/93 6/11/93 9/23/93 9/23/93	PARAMETER Gross Alpha Selenium Sulfate TDS Sulfate TDS	RESULT 26 pci/l 682 μg/l 360 mg/l 1100 mg/l 320 mg/l 1100 mg/l	ARAR 15 pci/l 10 μg/l 250 mg/l 400 mg/l 250 mg/l 400 mg/l
10592+	6/17/93	Sulfate	340 mg/l	250 mg/l
	6/17/93	TDS	1200 mg/l	400 mg/l
	6/17/93	Selenium	164 μg/l	10 µg/l
	9/23/93	Sulfate	350 mg/l	250 mg/l
	9/23/93	TDS	1200 mg/l	400 mg/l
10692+	6/11/93	Gross Alpha	18 pci/l	15 pci/l
	6/11/93	Sulfate	440 mg/l	250 mg/l
	6/11/93	TDS	1200 mg/l	400 mg/l
	9/23/93	Sulfate	340 mg/l	250 mg/l
	9/23/93	TDS	1300 mg/l	400 mg/l
10992	6/11/93	Nitrate/Nitrite	30 mg/l	10 mg/l
	9/22/93	Nitrate/Nitrite	24 mg/l	10 mg/l
35691	9/15/93	Gross Alpha	35 pci/l	15 pcı/l
45391	9/22/93	TDS	460 mg/l	400 mg/l

Spiked recovery not within control limits for this parameter

⁺ These wells located near or beyond the western termination of the french drain

Operable Unit Number 1 881 Hillside IM/IRA Collection Well Description of Activities

The collection well is located within Individual Hazardous Substance Site (IHSS) 119 1 upgradient of the French drain EG&G personnel were unable to collect water from the collection well in October and November 1993. It was assumed at that time that samples could not be obtained because of insufficient ground water in the area of the well. This condition had occurred on previous occasions. Data suggested that sufficient ground water was available in December 1993 however, it was discovered that the sample hydrant would not produce any water.

It was determined in January 1994 that the well pump was operational but the underground line which transfers water from the well to the collection well vault was broken. It is believed that the line and well had been damaged by movement (i.e. possible slumping) of the hillside

A system is being designed to bring water to the top of the collection well. Water will be routed to the collection vault above ground using double containment pipe. This modification was determined to be the most effective course of action for the following reasons

The collection well is located in an IHSS and excavation to fix the underground line could create additional health and safety concerns. This concern has been emphasized because the collection well is near the plutonium, hot spot, which was discovered after the collection well was installed.

Excavation in the area of the well could provoke further movement of the hillside and the same problem could occur again and the well would again be damaged

Replacement of the underground line would be a more costly and time consuming project than the proposed modification

The parts to modify and fix the collection well have been ordered and current labor resources can be utilized once the parts are received. The existing underground line will be abandoned and no extraneous health and safety requirements will be needed to perform the modification. The current schedule for completion of the new line is May 2. 1994 dependent on receiving the ordered parts.

